AMENDMENT

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously Presented) A method for sequencing a nucleic acid, the method comprising:

providing a substrate which comprises: a cavitated fiber optic wafer formed from a fused bundle of a plurality of individual optical fibers, each individual optical fiber having a diameter between 3 and 100 μm, the wafer comprising a top surface and a bottom surface, the top surface comprising at least 10,000 wells, wherein said wells are etched into the top surface of the cavitated fiber optic wafer and wherein the thickness of the wafer between the top surface and the bottom surface is between 0.5 mm and 5.0 mm in thickness; wherein the depth of each well ranges from between one half the diameter of an individual optical fiber and three times the diameter of an individual optical fiber; and wherein a plurality of wells on the top surface of the cavitated wafer have a nucleic acid therein; and a plurality of beads within wells on the top surface of the cavitated wafer, said beads having a pyrophosphate sequencing reagent attached thereto;

delivering additional pyrophosphate sequencing reagents, including sequential delivery of nucleotide triphosphates, from one or more reservoirs to the flow chamber so the beads and nucleic acids in the wells on the top surface of the fiber optic wafer are exposed to the reagents; and

detecting optical signals from each well using a detection means that is in communication with the wells, each optical signal being indicative of reaction of the pyrophosphate sequencing reagents with the nucleic acid in a well, thereby sequencing the nucleic acid.

2. (Previously Presented) The method of claim 1, wherein the nucleic acid is immobilized on said wells or beads.

3. (Cancelled)

4. (Cancelled)

5. (Cancelled)

6. (Previously Presented) The method of claim 1, wherein the-nucleic acid is DNA.

7. (Cancelled)

8. (Previously Presented) The method of claim 1, wherein the-nucleic acid is genomic DNA or cDNA.

9. (Previously Presented) The method of claim 1, wherein the nucleic acid is 10- 1000 nucleotides in length.

10. (Cancelled)

11. (Cancelled)

12. (Previously Presented) The method of claim 1, wherein pyrophosphate is produced as a sequencing byproduct.

13 (Previously Presented) The method of claim 12, wherein the pyrophosphate is detected by contacting the sequencing byproduct with a sulfurylase under conditions that allow formation of ATP.

14. (Original) The method of claim 13, wherein the sulfurylase is a thermostable sulfurylase.

15. (Previously Presented) The method of claim 12, further comprising adding apyrase to degrade unreacted nucleotide triphosphates.

16. (Previously Presented) The method of claim 12, further comprising washing the top surface of the fiber optic wafer with a buffer between each delivery of the nucleotide triphosphates.

17. (Previously Presented) The method of claim 16, wherein the buffer includes apyrase.

18. (Cancelled)

19. (Cancelled)

20. (Cancelled)

21. (Cancelled)

22. (Cancelled)

23. (Previously Presented) The method of claim 1, wherein the diameter of each individual optical fiber in the cavitated wafer is between 6-50 μm.

24. (Previously Presented) The method of claim 1, wherein the nucleic acid is sequenced in the presence of a dATP analog.

25. (Original) The method of claim 24, wherein the dATP analog is a thio ATP.

26. (Previously Presented) The method of claim 1, wherein the fiber optic surface includes two or more nucleic acids separated by approximately 10 μm to approximately 200 μm.

27. (Previously Presented) The method of claim 26, wherein the fiber optic surface includes two or more nucleic acids separated by approximately 50 μm to approximately 150 μm.

28. (Previously Presented) The method of claim 26, wherein the fiber optic surface includes two or more nucleic acids separated by approximately 100 μm to approximately 150 μm.

29. (Previously Presented) The method of claim 26, wherein the fiber optic surface includes two or more nucleic acids separated by approximately 150 μm.

30. (Cancelled)

31. (Cancelled)

32. (Cancelled)

33.-62. (Cancelled)

63. (Previously Presented) The method of claim 1, wherein said detection means is a CCD camera.

64. (Previously Presented) The method of claim 1, wherein the substrate has a polished fiber optic surface opposite to the cavitated fiber optic surface.

65. (Previously Presented) The method of claim 64, wherein the polished surface allows for optical coupling to a second optical fiber.

66. (Previously Presented) The method of claim 1, wherein the cavitated fiber optic wafer is coated.

67. (Previously Presented) The method of claim 66, wherein the coating is selected from the group consisting of plastic, gold layers, organosilane reagents, photoreactive linkers, hydrophilic polymer gels and pluronic polymers.

68 (Previously Presented) The method of claim 1, wherein said pyrophosphate sequencing reagent is luciferase.

69. (Previously Presented) The method of claim 1, wherein said pyrophosphate sequencing reagent is sulfurylase.

70. (Previously Presented) The method of claim 1, wherein said substrate further comprises 10^3 or more nucleic acids in said wells.

71. (Previously Presented) The method of claim 1, wherein said substrate comprises 10^4 or more nucleic acids in said wells.

72. (Previously Presented) The method of claim 1, wherein said substrate comprises 10^5 or more nucleic acids in said wells.

73. (Previously Presented) The method of claim 70, wherein the nucleic acids are attached to the wells or beads by a linker.

74. (Previously Presented) The method of claim 70, wherein the nucleic acids are covalently attached to the wells or beads.